

Signify Classified - Internal  
Cooper Lighting Solutions Photometric Lab  
1121 Highway 74 South  
Peachtree City, GA 30269



Scaled data based on original data using  
LM-79-08 Approved Method: Electrical and Photometric Measurements of Solid-  
State Lighting Products

Test Report Prepared for  
Cooper Lighting Solutions  
(formerly Eaton)

Brand: STREETWORKS

Report Number: P879991

Luminaire Tested: **MEM2-HSN-VA-110-750-U-WQ**

Issue Date: 10/01/2024

**Test Information**

Test Method: LM-79-08  
Report Number: P879991  
Test Lab: INNOVATION CENTER(G3)  
Issue Date: 10/01/2024  
Manufacturer: COOPER LIGHTING SOLUTIONS (FORMERLY EATON)  
Product Line: STREETWORKS  
Catalog Number: MEM2-HSN-VA-110-750-U-WQ  
Description: EPIC MODERN SHORT HOUSING 110W 70CRI 5000K VISUAL COMFORT FIXTURE  
w/ TYPE V WIDE DISTRIBUTION OPTIC  
Light Source: (1) 5000K CCT, 70 CRI LEDS  
Ballast/Driver: ELECTRONIC DRIVER

**Summary**

Lumens per Lamp: N/A  
Luminaire Lumens: 10569.3 lumens  
Efficiency: N/A  
Efficacy: 99.7 lumens/watt  
Luminous Opening: Circular (Dia: 1.12' x H: 0')  
IES Classification: Type V - Short  
BUG Rating: B3 - U0 - G3

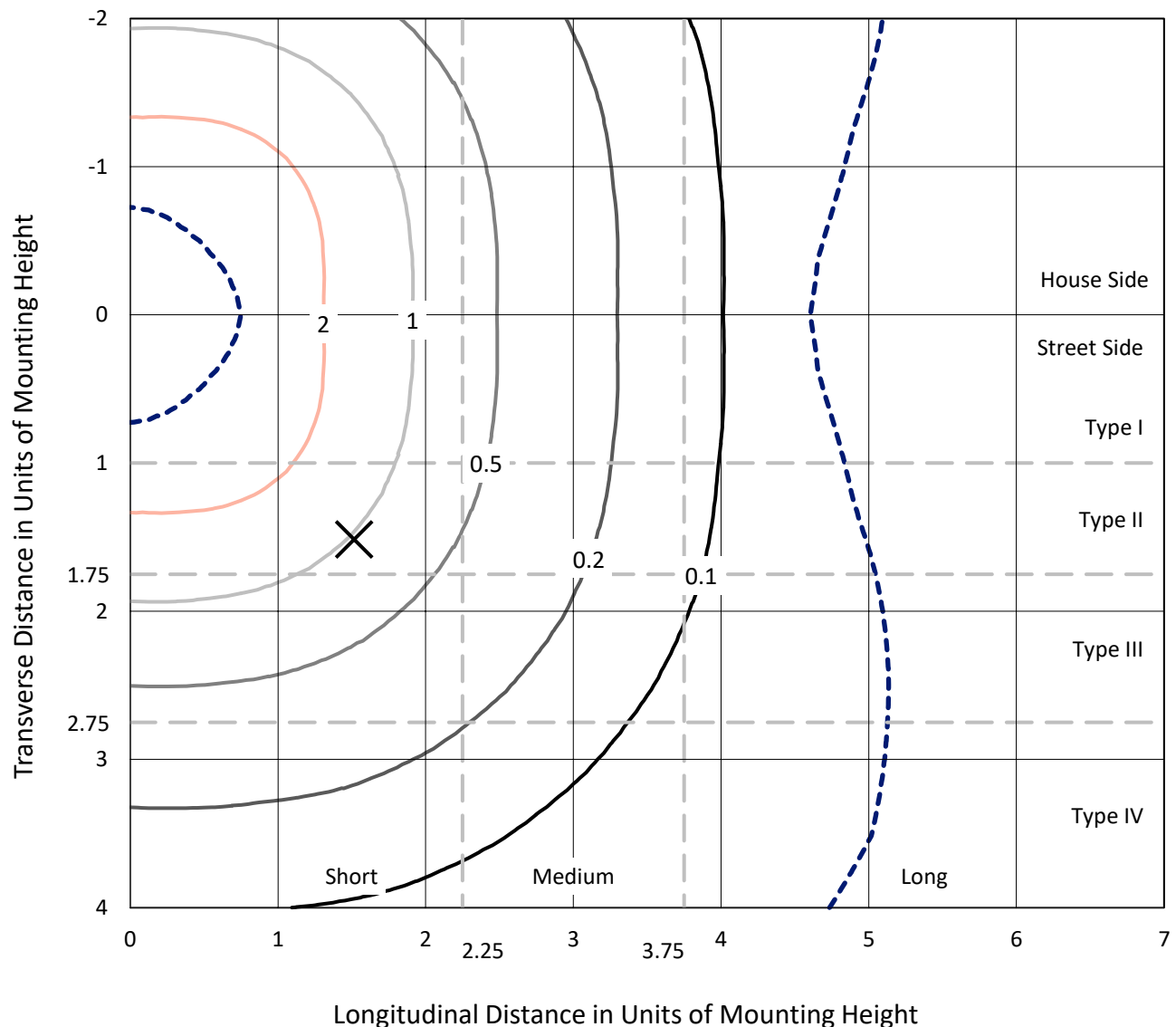
Input Watts (W): 106  
Input Voltage (V): 120  
Input Current (Ain): NR  
Voltage Rise (V): NR  
Power Factor: 0.99  
Total Harmonic Distortion (THDi): 5%  
Frequency (hertz): 60  
Stabilization Time: NR  
Operation Time: NR  
Ambient Temperature (°C): NR  
Test Distance: 24 FT

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CATALOG NUMBER: MEM2-HSN-VA-110-750-U-WQ

## Iso-Footcandle Lines of Horizontal Illumination

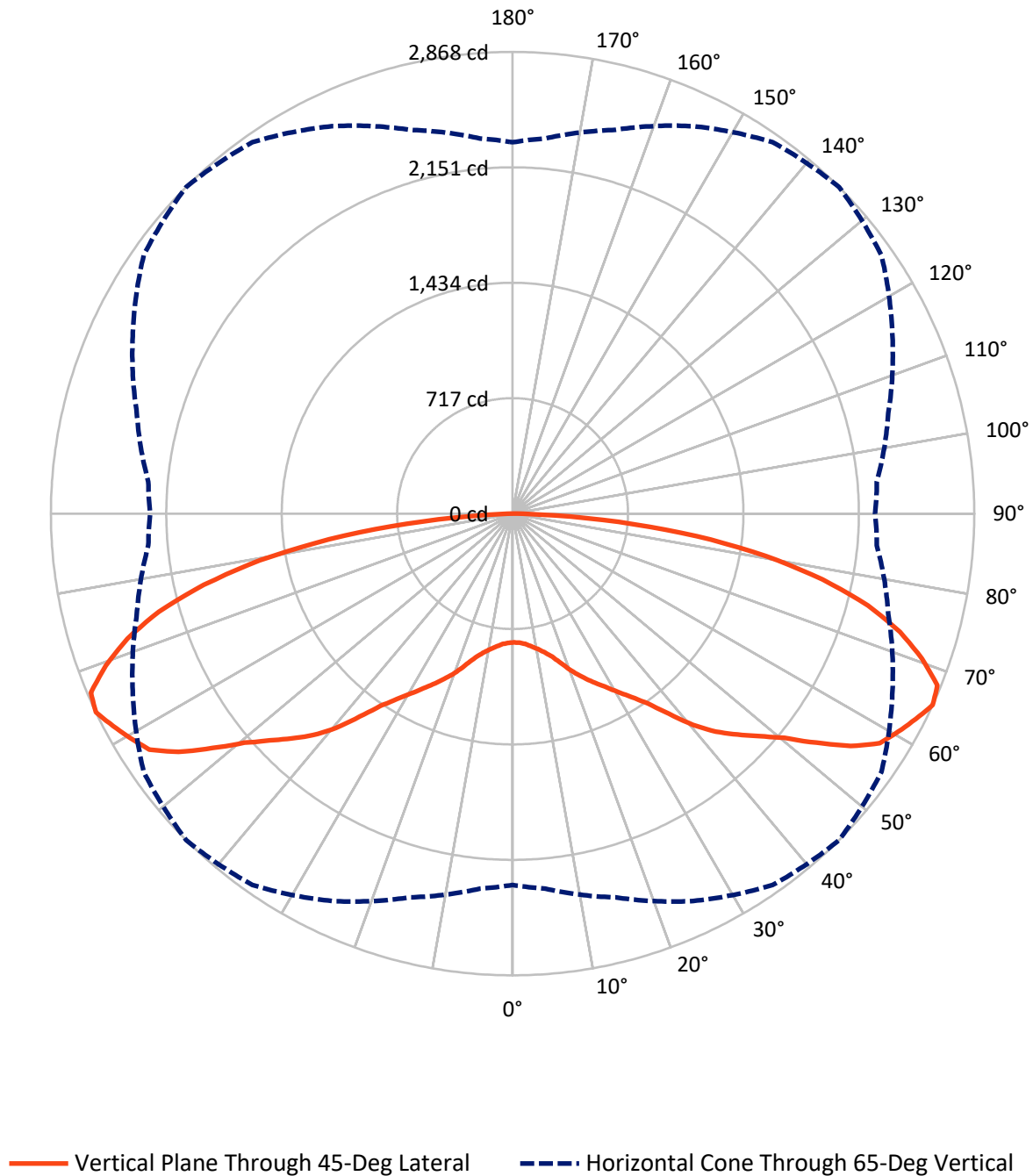
✕ Max cd  
 - - - 1/2 Max cd



Based on 15 foot mounting height. Maximum calculated value = 3.8 fc  
 Type V - Short - N/A

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## Luminous Intensity Polar Plot



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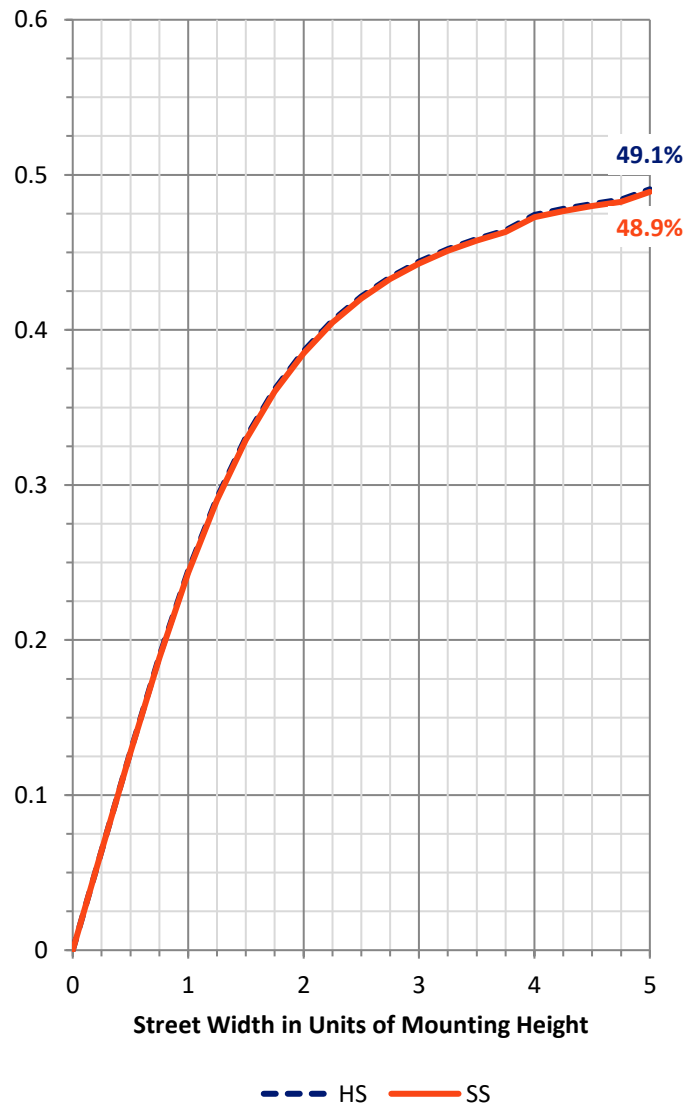
**FLUX DISTRIBUTION:**

|                    |           | Downward | Upward | Total   |
|--------------------|-----------|----------|--------|---------|
| <b>House Side</b>  | Lumens    | 5284.6   | 0.0    | 5284.6  |
|                    | % Fixture | 50.0     | 0.0    | 50.0    |
| <b>Street Side</b> | Lumens    | 5284.6   | 0.0    | 5284.6  |
|                    | % Fixture | 50.0     | 0.0    | 50.0    |
| <b>Total</b>       | Lumens    | 10569.3  | 0.0    | 10569.3 |
|                    | % Fixture | 100.0    | 0.0    | 100.0   |

**Coefficient of Utilization**

**ZONAL LUMENS:**

| Zone      | Lumens  | % Fixture |
|-----------|---------|-----------|
| 0°-10°    | 79.0    | 0.7       |
| 10°-20°   | 265.9   | 2.5       |
| 20°-30°   | 534.3   | 5.1       |
| 30°-40°   | 904.4   | 8.6       |
| 40°-50°   | 1445.8  | 13.7      |
| 50°-60°   | 2088.2  | 19.8      |
| 60°-70°   | 2514.6  | 23.8      |
| 70°-80°   | 2083.2  | 19.7      |
| 80°-90°   | 653.7   | 6.2       |
| 90°-100°  | 0.0     | 0.0       |
| 100°-110° | 0.0     | 0.0       |
| 110°-120° | 0.0     | 0.0       |
| 120°-130° | 0.0     | 0.0       |
| 130°-140° | 0.0     | 0.0       |
| 140°-150° | 0.0     | 0.0       |
| 150°-160° | 0.0     | 0.0       |
| 160°-170° | 0.0     | 0.0       |
| 170°-180° | 0.0     | 0.0       |
| 0°-90°    | 10569.3 | 100.0     |
| 0°-180°   | 10569.3 | 100.0     |



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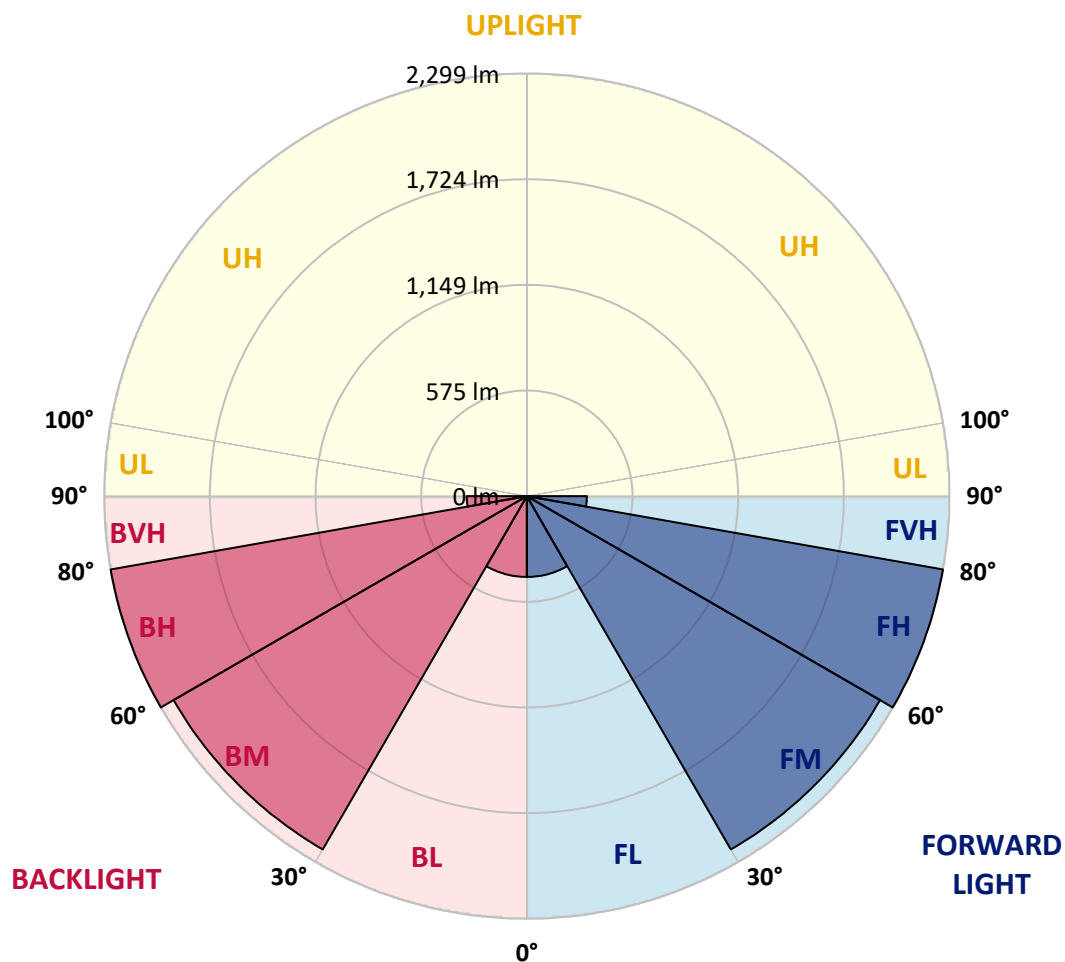
CATALOG NUMBER: MEM2-HSN-VA-110-750-U-WQ

**LUMINAIRE CLASSIFICATION SYSTEM LUMEN TABLE AND BUG RATING:**

| Zone |             | Lumens | % Fixture | Zone Rating/Lumen Limit |      |         |
|------|-------------|--------|-----------|-------------------------|------|---------|
|      |             |        |           | B                       | U    | G       |
| FL   | (0°-30°)    | 439.6  | 4.2       |                         |      |         |
| FM   | (30°-60°)   | 2219.2 | 21.0      |                         |      |         |
| FH   | (60°-80°)   | 2298.9 | 21.8      |                         |      | G2/5000 |
| FVH  | (80°-90°)   | 326.8  | 3.1       |                         |      | G3/500  |
| BL   | (0°-30°)    | 439.6  | 4.2       | B1/500                  |      |         |
| BM   | (30°-60°)   | 2219.2 | 21.0      | B2/2500                 |      |         |
| BH   | (60°-80°)   | 2298.9 | 21.8      | B3/2500                 |      | G2/5000 |
| BVH  | (80°-90°)   | 326.8  | 3.1       |                         |      | G3/500  |
| UL   | (90°-100°)  | 0.0    | 0.0       |                         | U0/0 |         |
| UH   | (100°-180°) | 0.0    | 0.0       |                         | U0/0 |         |

**BUG Rating: B3-U0-G3**

Type V Short





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**CANDELA DISTRIBUTION (FULL):**

|       | 0°     | 5°     | 15°    | 25°    | 35°    | 45°    | 55°    | 65°    | 75°    | 85°    | 90°    |
|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 0°    | 799.9  | 799.9  | 799.9  | 799.9  | 799.9  | 799.9  | 799.9  | 799.9  | 799.9  | 799.9  | 799.9  |
| 2.5°  | 803.2  | 803.2  | 803.2  | 803.2  | 803.2  | 803.2  | 803.2  | 803.2  | 803.2  | 803.2  | 803.2  |
| 5°    | 816.1  | 816.1  | 816.1  | 812.8  | 812.8  | 812.8  | 816.1  | 816.1  | 816.1  | 816.1  | 816.1  |
| 7.5°  | 832.2  | 832.2  | 832.2  | 832.2  | 832.2  | 832.2  | 829.0  | 829.0  | 829.0  | 829.0  | 832.2  |
| 10°   | 854.8  | 858.0  | 858.0  | 854.8  | 854.8  | 854.8  | 851.6  | 851.6  | 854.8  | 854.8  | 851.6  |
| 12.5° | 887.0  | 887.0  | 887.0  | 887.0  | 883.8  | 883.8  | 883.8  | 883.8  | 883.8  | 883.8  | 883.8  |
| 15°   | 922.5  | 922.5  | 922.5  | 922.5  | 922.5  | 922.5  | 922.5  | 922.5  | 919.3  | 916.1  | 916.1  |
| 17.5° | 967.7  | 964.4  | 970.9  | 967.7  | 974.1  | 977.4  | 970.9  | 967.7  | 964.4  | 961.2  | 958.0  |
| 20°   | 1022.5 | 1025.7 | 1032.2 | 1035.4 | 1038.6 | 1041.9 | 1032.2 | 1029.0 | 1022.5 | 1019.3 | 1016.1 |
| 22.5° | 1087.0 | 1087.0 | 1093.5 | 1093.5 | 1099.9 | 1099.9 | 1096.7 | 1087.0 | 1080.6 | 1080.6 | 1077.3 |
| 25°   | 1141.9 | 1145.1 | 1151.5 | 1151.5 | 1158.0 | 1158.0 | 1154.8 | 1148.3 | 1138.6 | 1132.2 | 1129.0 |
| 27.5° | 1199.9 | 1199.9 | 1203.1 | 1212.8 | 1216.0 | 1216.0 | 1212.8 | 1203.1 | 1190.2 | 1183.8 | 1183.8 |
| 30°   | 1254.8 | 1258.0 | 1261.2 | 1274.1 | 1280.6 | 1283.8 | 1270.9 | 1261.2 | 1245.1 | 1238.6 | 1238.6 |
| 32.5° | 1319.3 | 1319.3 | 1325.7 | 1345.1 | 1354.7 | 1358.0 | 1345.1 | 1328.9 | 1309.6 | 1296.7 | 1296.7 |
| 35°   | 1390.2 | 1387.0 | 1406.4 | 1425.7 | 1448.3 | 1448.3 | 1438.6 | 1412.8 | 1383.8 | 1367.6 | 1364.4 |
| 37.5° | 1483.8 | 1487.0 | 1506.3 | 1541.8 | 1577.3 | 1577.3 | 1567.6 | 1522.5 | 1490.2 | 1461.2 | 1454.7 |
| 40°   | 1593.4 | 1596.7 | 1632.1 | 1674.1 | 1712.8 | 1725.7 | 1706.3 | 1661.2 | 1606.3 | 1564.4 | 1561.2 |
| 42.5° | 1687.0 | 1699.9 | 1735.4 | 1793.4 | 1832.1 | 1851.5 | 1822.5 | 1770.8 | 1709.6 | 1661.2 | 1651.5 |
| 45°   | 1777.3 | 1790.2 | 1835.4 | 1896.6 | 1945.0 | 1957.9 | 1932.1 | 1870.8 | 1799.9 | 1748.3 | 1741.8 |
| 47.5° | 1861.2 | 1874.1 | 1919.2 | 1999.9 | 2051.5 | 2064.4 | 2041.8 | 1970.8 | 1883.7 | 1832.1 | 1825.7 |
| 50°   | 1938.6 | 1967.6 | 2022.4 | 2109.5 | 2183.7 | 2190.2 | 2157.9 | 2074.0 | 1983.7 | 1912.8 | 1903.1 |
| 52.5° | 2045.0 | 2057.9 | 2135.3 | 2251.5 | 2335.3 | 2364.4 | 2312.7 | 2222.4 | 2090.2 | 2006.3 | 1990.2 |
| 55°   | 2174.0 | 2180.5 | 2264.4 | 2399.8 | 2509.5 | 2548.2 | 2483.7 | 2367.6 | 2216.0 | 2132.1 | 2119.2 |
| 57.5° | 2248.2 | 2277.3 | 2374.0 | 2519.2 | 2638.5 | 2690.1 | 2628.8 | 2477.2 | 2328.9 | 2222.4 | 2193.4 |
| 60°   | 2280.5 | 2309.5 | 2416.0 | 2590.1 | 2719.2 | 2751.4 | 2706.3 | 2557.9 | 2364.4 | 2245.0 | 2225.7 |
| 62.5° | 2312.7 | 2341.8 | 2448.2 | 2638.5 | 2764.3 | 2809.5 | 2738.5 | 2606.3 | 2396.6 | 2280.5 | 2254.7 |
| 65°   | 2306.3 | 2338.5 | 2467.6 | 2654.7 | 2815.9 | 2867.5 | 2796.6 | 2603.0 | 2416.0 | 2270.8 | 2251.5 |
| 67.5° | 2241.8 | 2270.8 | 2406.3 | 2612.7 | 2790.1 | 2845.0 | 2767.5 | 2567.6 | 2357.9 | 2209.5 | 2186.9 |
| 70°   | 2112.8 | 2148.2 | 2280.5 | 2506.3 | 2670.8 | 2696.6 | 2638.5 | 2457.9 | 2238.6 | 2080.5 | 2051.5 |
| 72.5° | 1938.6 | 1974.1 | 2109.5 | 2341.8 | 2470.8 | 2516.0 | 2451.4 | 2296.6 | 2074.0 | 1912.8 | 1887.0 |
| 75°   | 1732.1 | 1754.7 | 1880.5 | 2099.9 | 2238.6 | 2280.5 | 2232.1 | 2064.4 | 1838.6 | 1709.6 | 1680.5 |
| 77.5° | 1490.2 | 1522.5 | 1635.4 | 1819.2 | 1928.9 | 1967.6 | 1922.4 | 1803.1 | 1593.4 | 1483.8 | 1461.2 |
| 80°   | 1170.9 | 1209.6 | 1312.8 | 1451.5 | 1567.6 | 1596.7 | 1558.0 | 1428.9 | 1296.7 | 1177.3 | 1151.5 |
| 82.5° | 845.1  | 854.8  | 948.3  | 1048.3 | 1135.4 | 1151.5 | 1122.5 | 1051.5 | 912.8  | 832.2  | 796.7  |
| 85°   | 441.9  | 454.8  | 522.5  | 596.7  | 651.6  | 661.2  | 648.3  | 570.9  | 525.8  | 451.6  | 422.6  |
| 87.5° | 100.0  | 103.2  | 122.6  | 135.5  | 164.5  | 161.3  | 171.0  | 135.5  | 129.0  | 106.4  | 93.5   |
| 90°   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    |

LM-79-2019: Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products

Report Prepared for

Cooper Lighting Solutions

Streetworks

Report Number: SP1-2407-176-6

Test Date: 09/26/2024

Luminaire Tested: MEM2-HTN-VA-30-750-U-WQ

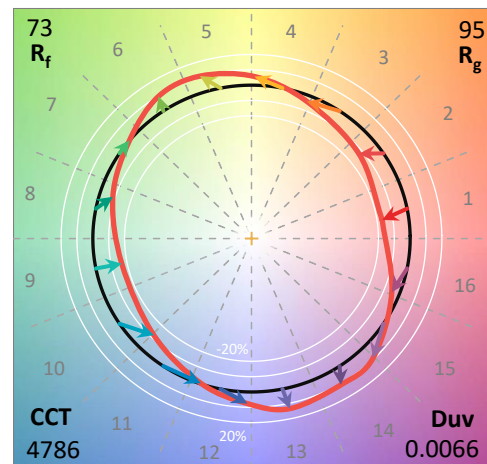
Data in this report applies to families of products including MEM2-HTN-VA-30-750-U-WQ

### Test Information

Test Method: LM-79-2019  
 Report Number: SP1-2407-176-6  
 Test Lab: COOPER LIGHTING SOLUTIONS  
 Photometer: SP1 - 76IN SPHERE  
 Measurement Geometry:  $4\pi$   
 Issue Date: 09/27/2024  
 Manufacturer: COOPER LIGHTING SOLUTIONS  
 Product Line: Streetworks  
 Catalog Number: **MEM2-HTN-VA-30-750-U-WQ**  
 Description: EPIC MODERN VISUAL COMFORT 30W WAVESTREAM WIDE

### Spectral Parameters

|                           |          |           |      |      |       |
|---------------------------|----------|-----------|------|------|-------|
| CCT (K):                  | 4786     | CRI (Ra): | 70.9 |      |       |
| CIE u':                   | 0.2093   | R1:       | 67.8 | R9:  | -29.8 |
| CIE v':                   | 0.4953   | R2:       | 75.1 | R10: | 40.9  |
| Duv:                      | 0.0066   | R3:       | 80.6 | R11: | 67.4  |
| CIE x:                    | 0.3533   | R4:       | 71.6 | R12: | 35.3  |
| CIE y:                    | 0.3716   | R5:       | 67.8 | R13: | 68.5  |
| CIE z:                    | 0.2751   | R6:       | 65.4 | R14: | 89.0  |
| Peak Wavelength (nm):     | 449      | R7:       | 82.0 | R15: | 60.9  |
| Dominant Wavelength (nm): | 570      | R8:       | 57.0 |      |       |
| Purity:                   | 17.53512 |           |      |      |       |
| Rf:                       | 73       |           |      |      |       |
| Rg:                       | 94.6     |           |      |      |       |



### Test Conditions

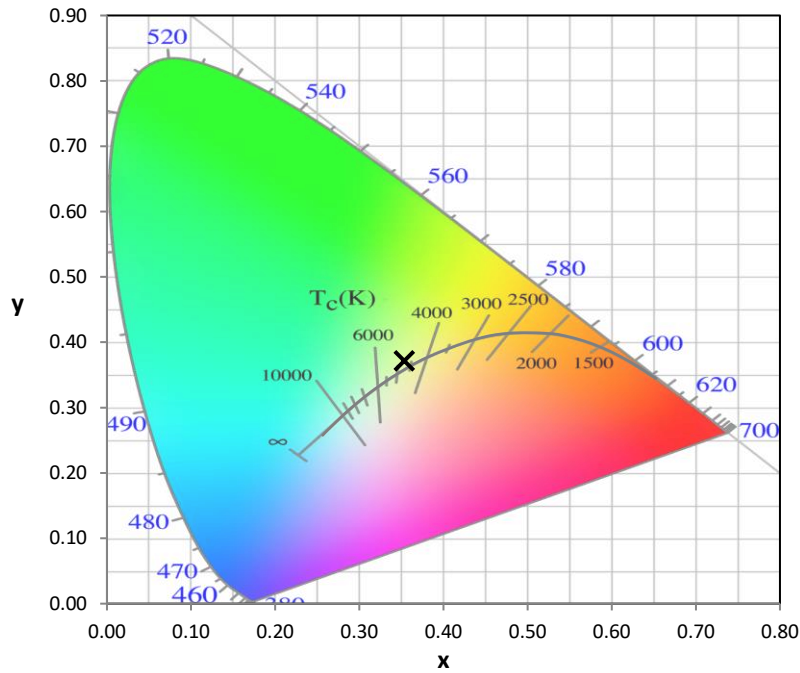
Stabilization Time: 45M  
 Operation Time: 1H 45M  
 Sphere Temperature (°C): 25.2

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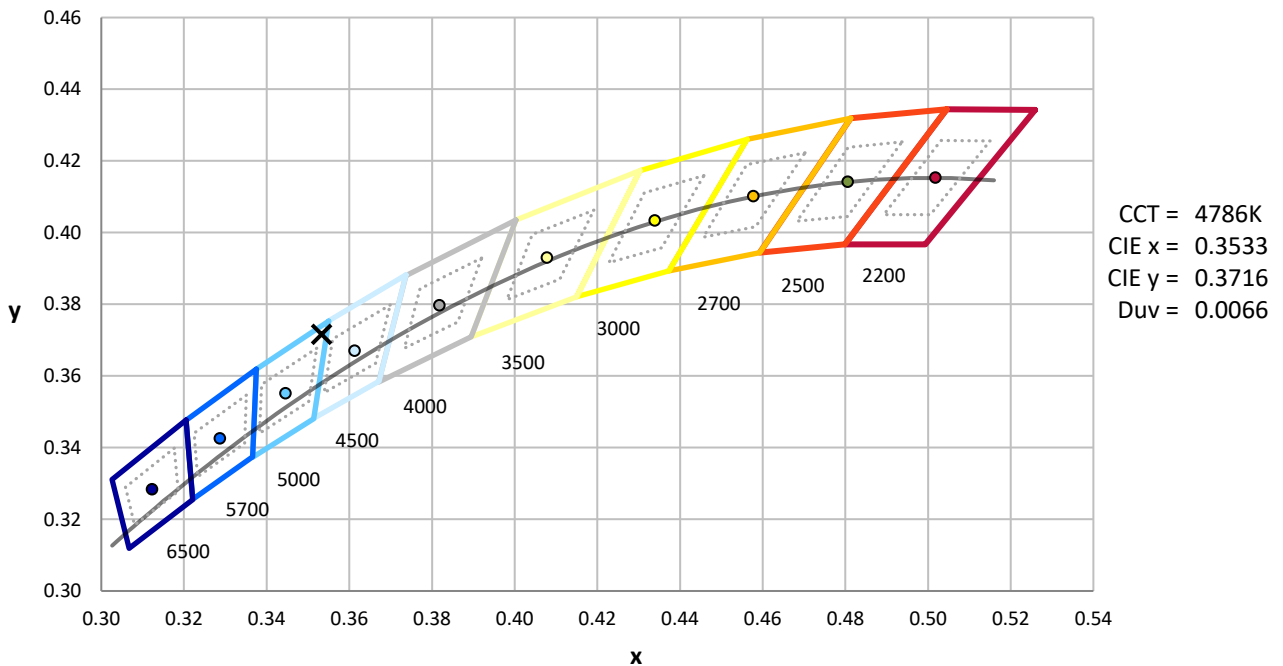
| Measurement and Test Equipment |                       |                  |                      |
|--------------------------------|-----------------------|------------------|----------------------|
| Instrument                     | Identification Number | Calibration Date | Calibration Due Date |
| Photometer                     | IN0058                | 6/18/2024        | 12/18/2024           |
| Power Meter                    | INXT2011004           | 2/8/2024         | 2/8/2025             |
| AC Power Source                | IN0063                | 10/24/2023       | 10/24/2024           |
| DC Power Source                | IN0208                | 10/24/2023       | 10/24/2024           |
| Sphere Thermometer             | IN0085                | 10/24/2023       | 10/24/2024           |
| Room Thermometer               | IN0046                | 10/24/2023       | 10/24/2024           |

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**CIE 1931 Chromaticity Diagram**



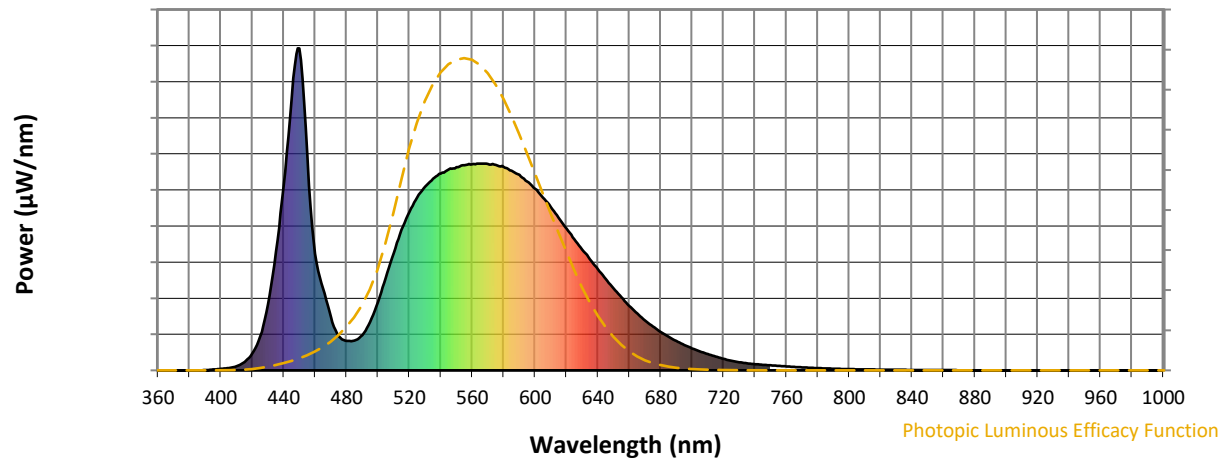
**CIE 1931 Chromaticity Diagram with 2017 ANSI 7-Step and 4-Step Quadrangles**



Point lies inside the ANSI 5000K 7-step quadrangle

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### Photopic Flux vs. Wavelength

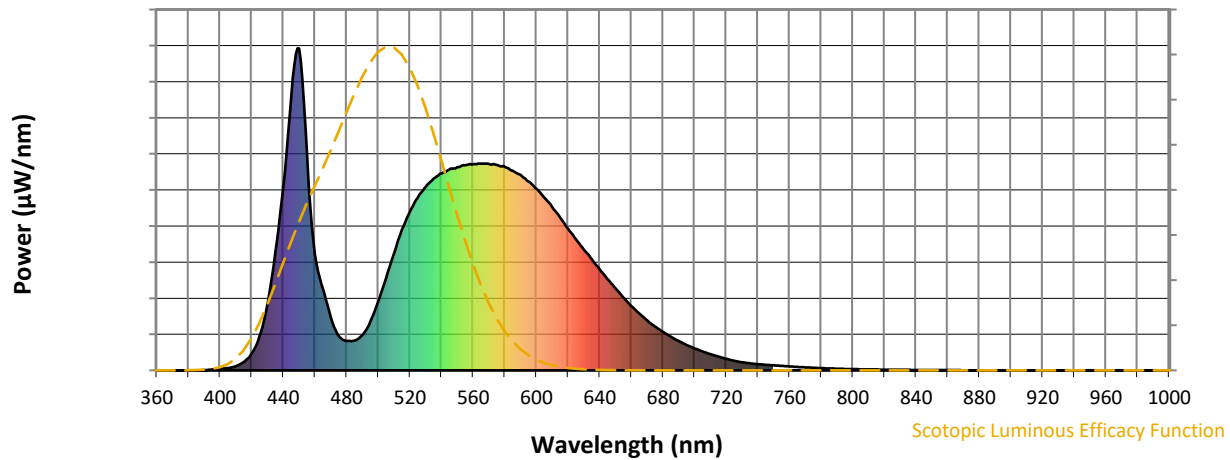


### Photopic Lumens: NR

| $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) | $\lambda$<br>(nm) | Power<br>$\text{W}^\wedge/\text{nm}$ | Lumens<br>( $\phi/\text{nm}$ ) |
|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|-------------------|--------------------------------------|--------------------------------|
| 360               | 0                                    | NR                             | 490               | 110                                  | NR                             | 620               | 440                                  | NR                             | 750               | 16                                   | NR                             | 880               | 0                                    | NR                             |
| 365               | 0                                    | NR                             | 495               | 150                                  | NR                             | 625               | 407                                  | NR                             | 755               | 14                                   | NR                             | 885               | 0                                    | NR                             |
| 370               | 0                                    | NR                             | 500               | 213                                  | NR                             | 630               | 375                                  | NR                             | 760               | 12                                   | NR                             | 890               | 0                                    | NR                             |
| 375               | 0                                    | NR                             | 505               | 288                                  | NR                             | 635               | 345                                  | NR                             | 765               | 11                                   | NR                             | 895               | 0                                    | NR                             |
| 380               | 0                                    | NR                             | 510               | 364                                  | NR                             | 640               | 314                                  | NR                             | 770               | 9                                    | NR                             | 900               | 0                                    | NR                             |
| 385               | 0                                    | NR                             | 515               | 436                                  | NR                             | 645               | 283                                  | NR                             | 775               | 8                                    | NR                             | 905               | 0                                    | NR                             |
| 390               | 1                                    | NR                             | 520               | 492                                  | NR                             | 650               | 254                                  | NR                             | 780               | 7                                    | NR                             | 910               | 0                                    | NR                             |
| 395               | 3                                    | NR                             | 525               | 537                                  | NR                             | 655               | 227                                  | NR                             | 785               | 6                                    | NR                             | 915               | 0                                    | NR                             |
| 400               | 5                                    | NR                             | 530               | 570                                  | NR                             | 660               | 200                                  | NR                             | 790               | 5                                    | NR                             | 920               | 0                                    | NR                             |
| 405               | 7                                    | NR                             | 535               | 595                                  | NR                             | 665               | 177                                  | NR                             | 795               | 4                                    | NR                             | 925               | 0                                    | NR                             |
| 410               | 13                                   | NR                             | 540               | 611                                  | NR                             | 670               | 155                                  | NR                             | 800               | 4                                    | NR                             | 930               | 0                                    | NR                             |
| 415               | 25                                   | NR                             | 545               | 624                                  | NR                             | 675               | 136                                  | NR                             | 805               | 3                                    | NR                             | 935               | 0                                    | NR                             |
| 420               | 52                                   | NR                             | 550               | 631                                  | NR                             | 680               | 119                                  | NR                             | 810               | 3                                    | NR                             | 940               | 0                                    | NR                             |
| 425               | 106                                  | NR                             | 555               | 637                                  | NR                             | 685               | 104                                  | NR                             | 815               | 3                                    | NR                             | 945               | 0                                    | NR                             |
| 430               | 204                                  | NR                             | 560               | 640                                  | NR                             | 690               | 91                                   | NR                             | 820               | 2                                    | NR                             | 950               | 0                                    | NR                             |
| 435               | 369                                  | NR                             | 565               | 642                                  | NR                             | 695               | 79                                   | NR                             | 825               | 2                                    | NR                             | 955               | 0                                    | NR                             |
| 440               | 573                                  | NR                             | 570               | 641                                  | NR                             | 700               | 68                                   | NR                             | 830               | 2                                    | NR                             | 960               | 0                                    | NR                             |
| 445               | 844                                  | NR                             | 575               | 638                                  | NR                             | 705               | 59                                   | NR                             | 835               | 2                                    | NR                             | 965               | 0                                    | NR                             |
| 450               | 999                                  | NR                             | 580               | 632                                  | NR                             | 710               | 50                                   | NR                             | 840               | 1                                    | NR                             | 970               | 0                                    | NR                             |
| 455               | 668                                  | NR                             | 585               | 620                                  | NR                             | 715               | 43                                   | NR                             | 845               | 1                                    | NR                             | 975               | 0                                    | NR                             |
| 460               | 361                                  | NR                             | 590               | 607                                  | NR                             | 720               | 36                                   | NR                             | 850               | 1                                    | NR                             | 980               | 0                                    | NR                             |
| 465               | 255                                  | NR                             | 595               | 586                                  | NR                             | 725               | 30                                   | NR                             | 855               | 1                                    | NR                             | 985               | 0                                    | NR                             |
| 470               | 165                                  | NR                             | 600               | 564                                  | NR                             | 730               | 25                                   | NR                             | 860               | 1                                    | NR                             | 990               | 0                                    | NR                             |
| 475               | 106                                  | NR                             | 605               | 537                                  | NR                             | 735               | 22                                   | NR                             | 865               | 1                                    | NR                             | 995               | 0                                    | NR                             |
| 480               | 91                                   | NR                             | 610               | 507                                  | NR                             | 740               | 19                                   | NR                             | 870               | 0                                    | NR                             | 1000              | 0                                    | NR                             |
| 485               | 93                                   | NR                             | 615               | 474                                  | NR                             | 745               | 17                                   | NR                             | 875               | 0                                    | NR                             |                   |                                      |                                |

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### Scotopic Flux vs. Wavelength



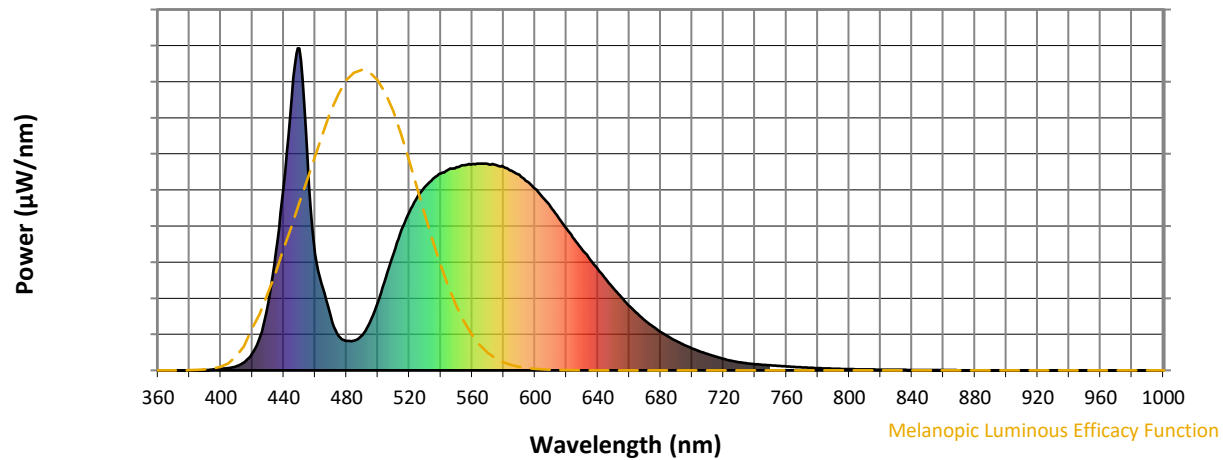
Scotopic Lumens: NR

S/P: 1.69

| λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(Φ/nm) | λ<br>(nm) | Power<br>W <sup>^</sup> /nm | Lumens<br>(Φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 110                         | NR               | 620       | 440                         | NR               | 750       | 16                          | NR               | 880       | 0                           | NR               |
| 365       | 0                           | NR               | 495       | 150                         | NR               | 625       | 407                         | NR               | 755       | 14                          | NR               | 885       | 0                           | NR               |
| 370       | 0                           | NR               | 500       | 213                         | NR               | 630       | 375                         | NR               | 760       | 12                          | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 288                         | NR               | 635       | 345                         | NR               | 765       | 11                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 364                         | NR               | 640       | 314                         | NR               | 770       | 9                           | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 436                         | NR               | 645       | 283                         | NR               | 775       | 8                           | NR               | 905       | 0                           | NR               |
| 390       | 1                           | NR               | 520       | 492                         | NR               | 650       | 254                         | NR               | 780       | 7                           | NR               | 910       | 0                           | NR               |
| 395       | 3                           | NR               | 525       | 537                         | NR               | 655       | 227                         | NR               | 785       | 6                           | NR               | 915       | 0                           | NR               |
| 400       | 5                           | NR               | 530       | 570                         | NR               | 660       | 200                         | NR               | 790       | 5                           | NR               | 920       | 0                           | NR               |
| 405       | 7                           | NR               | 535       | 595                         | NR               | 665       | 177                         | NR               | 795       | 4                           | NR               | 925       | 0                           | NR               |
| 410       | 13                          | NR               | 540       | 611                         | NR               | 670       | 155                         | NR               | 800       | 4                           | NR               | 930       | 0                           | NR               |
| 415       | 25                          | NR               | 545       | 624                         | NR               | 675       | 136                         | NR               | 805       | 3                           | NR               | 935       | 0                           | NR               |
| 420       | 52                          | NR               | 550       | 631                         | NR               | 680       | 119                         | NR               | 810       | 3                           | NR               | 940       | 0                           | NR               |
| 425       | 106                         | NR               | 555       | 637                         | NR               | 685       | 104                         | NR               | 815       | 3                           | NR               | 945       | 0                           | NR               |
| 430       | 204                         | NR               | 560       | 640                         | NR               | 690       | 91                          | NR               | 820       | 2                           | NR               | 950       | 0                           | NR               |
| 435       | 369                         | NR               | 565       | 642                         | NR               | 695       | 79                          | NR               | 825       | 2                           | NR               | 955       | 0                           | NR               |
| 440       | 573                         | NR               | 570       | 641                         | NR               | 700       | 68                          | NR               | 830       | 2                           | NR               | 960       | 0                           | NR               |
| 445       | 844                         | NR               | 575       | 638                         | NR               | 705       | 59                          | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 999                         | NR               | 580       | 632                         | NR               | 710       | 50                          | NR               | 840       | 1                           | NR               | 970       | 0                           | NR               |
| 455       | 668                         | NR               | 585       | 620                         | NR               | 715       | 43                          | NR               | 845       | 1                           | NR               | 975       | 0                           | NR               |
| 460       | 361                         | NR               | 590       | 607                         | NR               | 720       | 36                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 255                         | NR               | 595       | 586                         | NR               | 725       | 30                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 165                         | NR               | 600       | 564                         | NR               | 730       | 25                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 106                         | NR               | 605       | 537                         | NR               | 735       | 22                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 91                          | NR               | 610       | 507                         | NR               | 740       | 19                          | NR               | 870       | 0                           | NR               | 1000      | 0                           | NR               |
| 485       | 93                          | NR               | 615       | 474                         | NR               | 745       | 17                          | NR               | 875       | 0                           | NR               |           |                             |                  |

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### Melanopic Flux vs. Wavelength



Melanopic Lumens: NR

M/P: 3.36

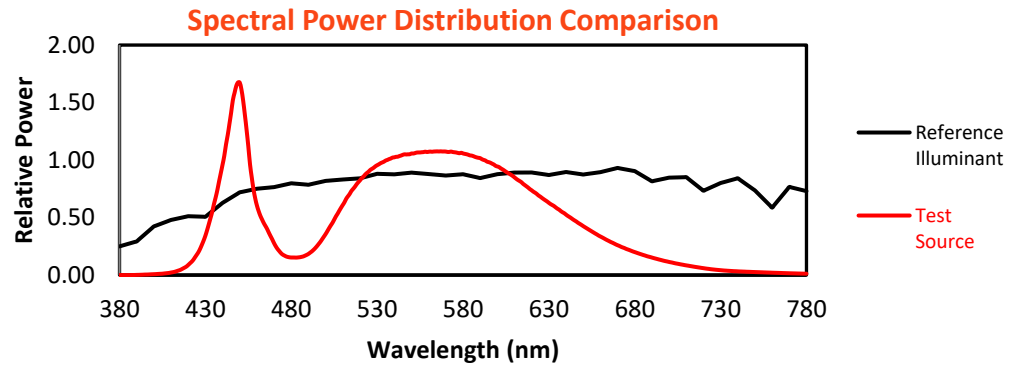
| λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) | λ<br>(nm) | Power<br>W <sup>λ</sup> /nm | Lumens<br>(φ/nm) |
|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|-----------|-----------------------------|------------------|
| 360       | 0                           | NR               | 490       | 110                         | NR               | 620       | 440                         | NR               | 750       | 16                          | NR               | 880       | 0                           | NR               |
| 365       | 0                           | NR               | 495       | 150                         | NR               | 625       | 407                         | NR               | 755       | 14                          | NR               | 885       | 0                           | NR               |
| 370       | 0                           | NR               | 500       | 213                         | NR               | 630       | 375                         | NR               | 760       | 12                          | NR               | 890       | 0                           | NR               |
| 375       | 0                           | NR               | 505       | 288                         | NR               | 635       | 345                         | NR               | 765       | 11                          | NR               | 895       | 0                           | NR               |
| 380       | 0                           | NR               | 510       | 364                         | NR               | 640       | 314                         | NR               | 770       | 9                           | NR               | 900       | 0                           | NR               |
| 385       | 0                           | NR               | 515       | 436                         | NR               | 645       | 283                         | NR               | 775       | 8                           | NR               | 905       | 0                           | NR               |
| 390       | 1                           | NR               | 520       | 492                         | NR               | 650       | 254                         | NR               | 780       | 7                           | NR               | 910       | 0                           | NR               |
| 395       | 3                           | NR               | 525       | 537                         | NR               | 655       | 227                         | NR               | 785       | 6                           | NR               | 915       | 0                           | NR               |
| 400       | 5                           | NR               | 530       | 570                         | NR               | 660       | 200                         | NR               | 790       | 5                           | NR               | 920       | 0                           | NR               |
| 405       | 7                           | NR               | 535       | 595                         | NR               | 665       | 177                         | NR               | 795       | 4                           | NR               | 925       | 0                           | NR               |
| 410       | 13                          | NR               | 540       | 611                         | NR               | 670       | 155                         | NR               | 800       | 4                           | NR               | 930       | 0                           | NR               |
| 415       | 25                          | NR               | 545       | 624                         | NR               | 675       | 136                         | NR               | 805       | 3                           | NR               | 935       | 0                           | NR               |
| 420       | 52                          | NR               | 550       | 631                         | NR               | 680       | 119                         | NR               | 810       | 3                           | NR               | 940       | 0                           | NR               |
| 425       | 106                         | NR               | 555       | 637                         | NR               | 685       | 104                         | NR               | 815       | 3                           | NR               | 945       | 0                           | NR               |
| 430       | 204                         | NR               | 560       | 640                         | NR               | 690       | 91                          | NR               | 820       | 2                           | NR               | 950       | 0                           | NR               |
| 435       | 369                         | NR               | 565       | 642                         | NR               | 695       | 79                          | NR               | 825       | 2                           | NR               | 955       | 0                           | NR               |
| 440       | 573                         | NR               | 570       | 641                         | NR               | 700       | 68                          | NR               | 830       | 2                           | NR               | 960       | 0                           | NR               |
| 445       | 844                         | NR               | 575       | 638                         | NR               | 705       | 59                          | NR               | 835       | 2                           | NR               | 965       | 0                           | NR               |
| 450       | 999                         | NR               | 580       | 632                         | NR               | 710       | 50                          | NR               | 840       | 1                           | NR               | 970       | 0                           | NR               |
| 455       | 668                         | NR               | 585       | 620                         | NR               | 715       | 43                          | NR               | 845       | 1                           | NR               | 975       | 0                           | NR               |
| 460       | 361                         | NR               | 590       | 607                         | NR               | 720       | 36                          | NR               | 850       | 1                           | NR               | 980       | 0                           | NR               |
| 465       | 255                         | NR               | 595       | 586                         | NR               | 725       | 30                          | NR               | 855       | 1                           | NR               | 985       | 0                           | NR               |
| 470       | 165                         | NR               | 600       | 564                         | NR               | 730       | 25                          | NR               | 860       | 1                           | NR               | 990       | 0                           | NR               |
| 475       | 106                         | NR               | 605       | 537                         | NR               | 735       | 22                          | NR               | 865       | 1                           | NR               | 995       | 0                           | NR               |
| 480       | 91                          | NR               | 610       | 507                         | NR               | 740       | 19                          | NR               | 870       | 0                           | NR               | 1000      | 0                           | NR               |
| 485       | 93                          | NR               | 615       | 474                         | NR               | 745       | 17                          | NR               | 875       | 0                           | NR               |           |                             |                  |

REPORT NUMBER: SP1-2407-176-6

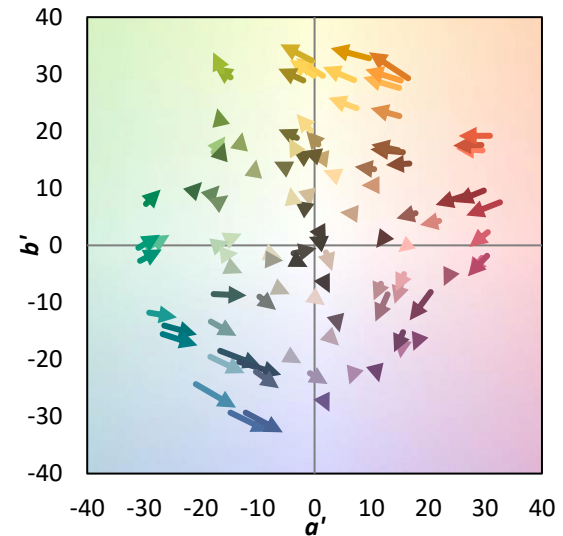
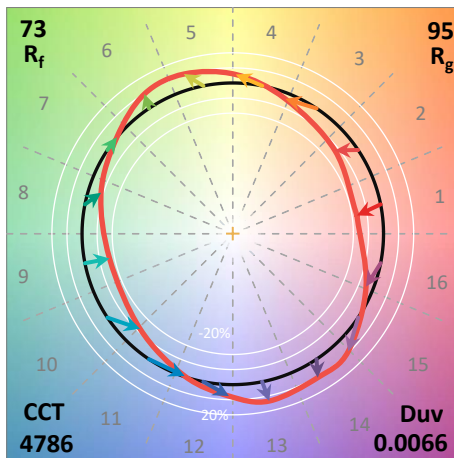
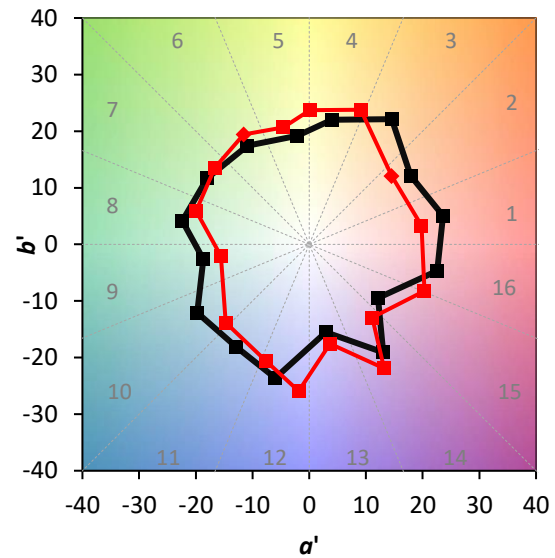
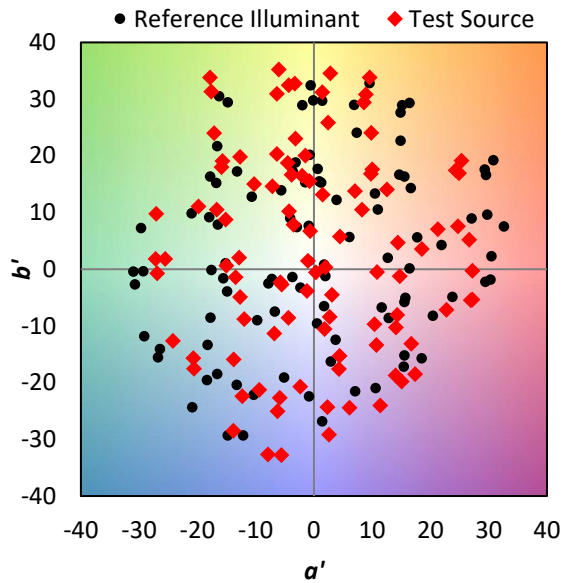
TM-30-18

### Summary

$R_f = 73$   
 $R_g = 94.6$   
 $CIE R_a = 70.9$   
 $R_g = -29.8$

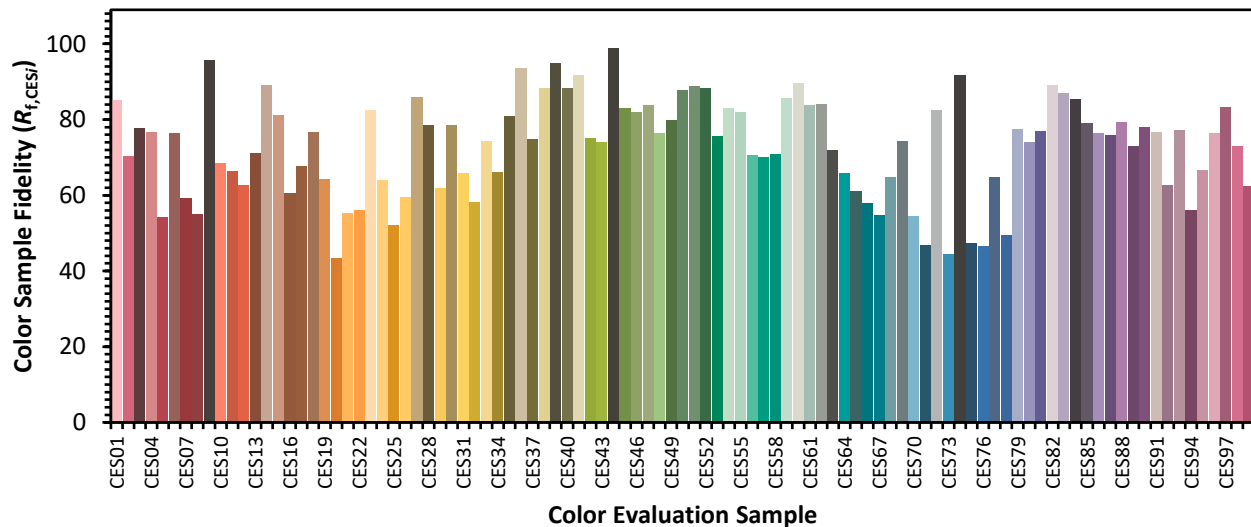


### Color Vector Graphics

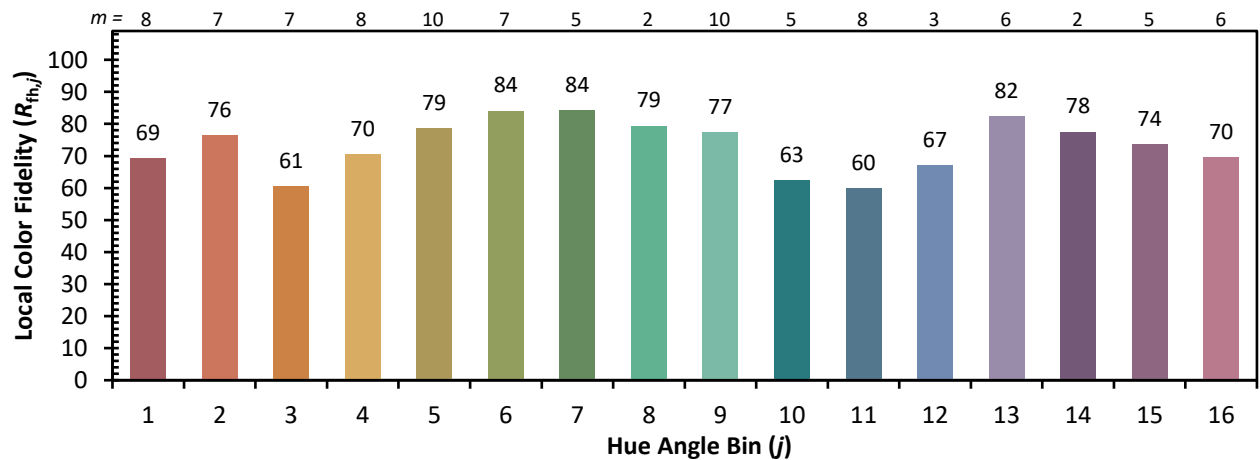
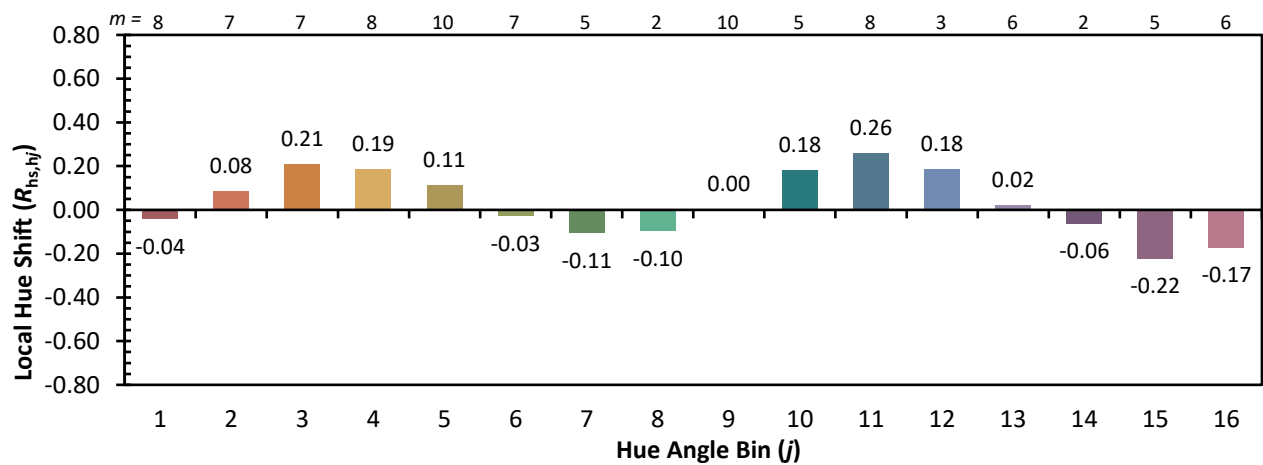
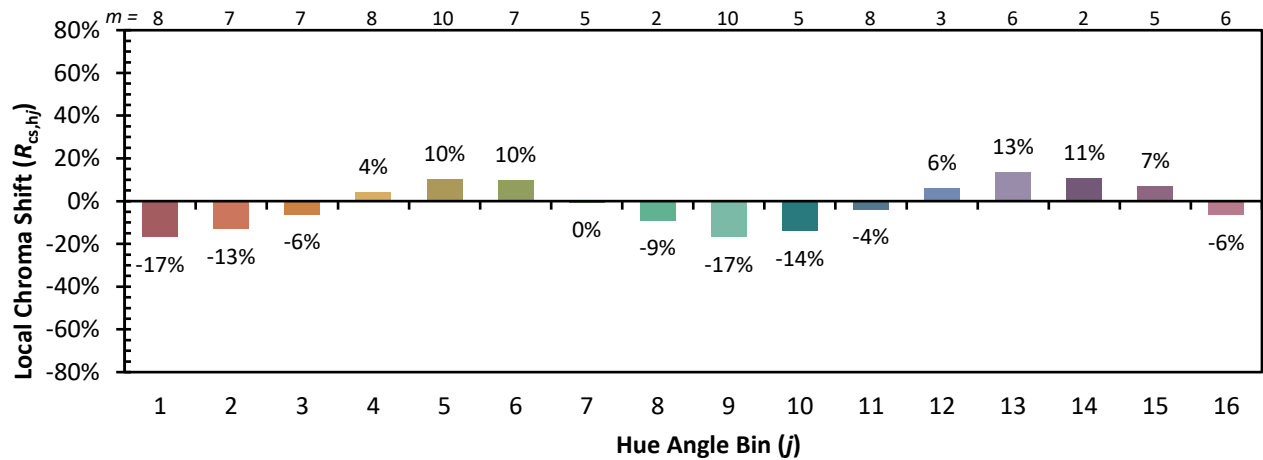


**Individual Sample Fidelity Index ( $R_{f,i}$ )**

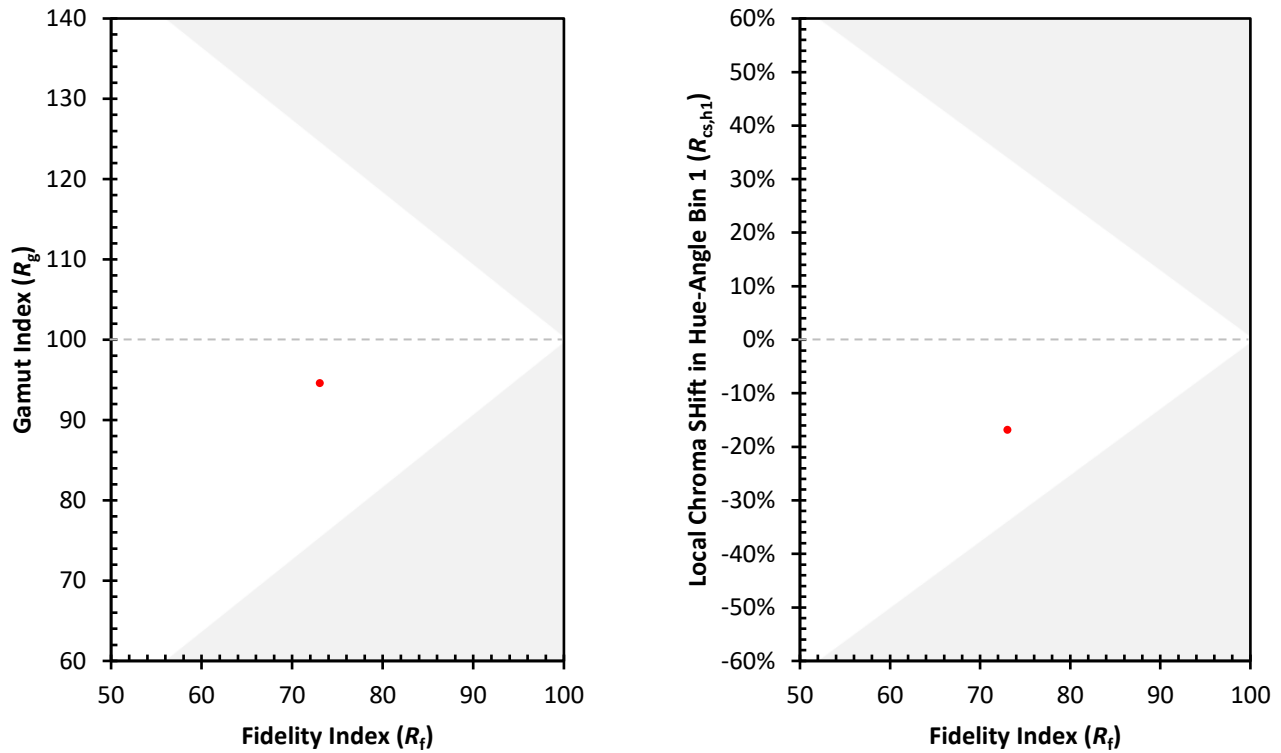
|            |            |            |            |
|------------|------------|------------|------------|
| CES01 = 85 | CES26 = 60 | CES51 = 89 | CES76 = 46 |
| CES02 = 59 | CES27 = 86 | CES52 = 88 | CES77 = 65 |
| CES03 = 30 | CES28 = 78 | CES53 = 76 | CES78 = 49 |
| CES04 = 69 | CES29 = 62 | CES54 = 83 | CES79 = 78 |
| CES05 = 46 | CES30 = 79 | CES55 = 82 | CES80 = 74 |
| CES06 = 50 | CES31 = 66 | CES56 = 71 | CES81 = 77 |
| CES07 = 39 | CES32 = 58 | CES57 = 70 | CES82 = 89 |
| CES08 = 38 | CES33 = 74 | CES58 = 71 | CES83 = 87 |
| CES09 = 29 | CES34 = 66 | CES59 = 86 | CES84 = 86 |
| CES10 = 72 | CES35 = 81 | CES60 = 90 | CES85 = 79 |
| CES11 = 56 | CES36 = 94 | CES61 = 84 | CES86 = 76 |
| CES12 = 61 | CES37 = 75 | CES62 = 84 | CES87 = 76 |
| CES13 = 41 | CES38 = 88 | CES63 = 72 | CES88 = 79 |
| CES14 = 74 | CES39 = 95 | CES64 = 66 | CES89 = 73 |
| CES15 = 70 | CES40 = 88 | CES65 = 61 | CES90 = 78 |
| CES16 = 46 | CES41 = 92 | CES66 = 58 | CES91 = 77 |
| CES17 = 49 | CES42 = 75 | CES67 = 55 | CES92 = 63 |
| CES18 = 55 | CES43 = 74 | CES68 = 65 | CES93 = 77 |
| CES19 = 71 | CES44 = 99 | CES69 = 74 | CES94 = 56 |
| CES20 = 64 | CES45 = 83 | CES70 = 55 | CES95 = 67 |
| CES21 = 85 | CES46 = 82 | CES71 = 47 | CES96 = 76 |
| CES22 = 77 | CES47 = 84 | CES72 = 82 | CES97 = 83 |
| CES23 = 91 | CES48 = 76 | CES73 = 44 | CES98 = 73 |
| CES24 = 90 | CES49 = 80 | CES74 = 92 | CES99 = 62 |
| CES25 = 71 | CES50 = 88 | CES75 = 47 |            |



Color Rendition by Hue-Angle Bin



**Measure Comparisons**



(END OF REPORT)